

## PATENT ABSTRACTS OF JAPAN

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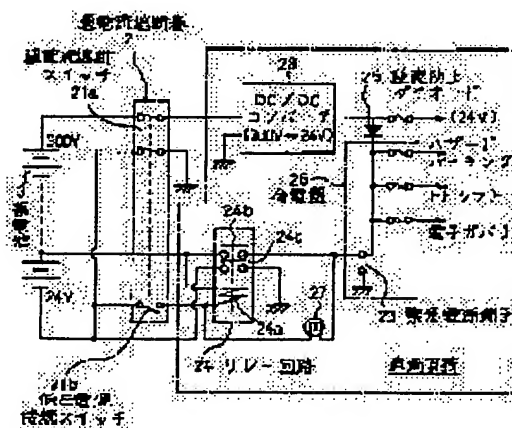
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## (54) BRAKING OF INTERNAL COMBUSTION ENGINE AND AUXILIARY POWER ARRANGEMENT

## (57)Abstract:

PURPOSE: To supply the irreducible minimum of power supply to an emergency power supply terminal by providing an overcurrent breaker connected to the terminal of a storage battery in series and a relay circuit for connecting a terminal voltage of a part of cells of a storage battery to an emergency power supply terminal by interlocking with this overcurrent breaker, when the overcurrent breaker turns into an open condition.

CONSTITUTION: When overcurrent flows from the high voltage circuit of a storage battery due to unexpected failure, the overcurrent breaking switch 21a of an overcurrent breaker 21 automatically turns into an open condition so as to break the power supply from the storage battery. At the same time, a low-voltage power supply connection switch 21b is set into a closed condition by interlocking with action of the overcurrent breaking switch 21a. When the low-voltage power supply connection switch 21b turns into the closed condition, terminal voltage from a part of cells equivalent to voltage 24V of a storage battery is applied to the coil 24a of a relay circuit 24. Thus relay switches 24b and 24c are set into closed conditions and the minimum 24V power supply necessary for vehicle operation is supplied to an emergency power supply terminal 23 of a distributing board 26.



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CLAIMS

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## [Claim(s)]

[Claim 1] The squirrel-cage induction machine connected with an internal combustion engine's revolving shaft, and the battery by which the series connection of many cels was carried out, In braking of an internal combustion engine and an APU equipped with the inverter circuit which changes electrical energy bidirectionally and combines the polyphase current circuit of said squirrel-cage induction machine, and the direct current circuit of said battery, and the control circuit which controls this inverter circuit When the overcurrent breaker connected to the terminal of said battery at the serial and this overcurrent breaker change into an open condition, An internal combustion engine's braking and APU which are characterized by having the relay circuit which is interlocked with this overcurrent breaker and connects the terminal voltage of some cels of said battery to an emergency power supply terminal.

[Claim 2] It is braking of an internal combustion engine according to claim 1 and the APU which are equal to the rated terminal voltage (a large-size car is 24V and a small-size car is 12V) of the automobile where the rated voltage is standard as for said emergency power supply terminal and by which said emergency power supply terminal was connected to the various loads of a car through antisuckback diode.

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DETAILED DESCRIPTION

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## [Detailed Description of the Invention]

[0001]

[Industrial Application] This invention is used for the equipment which supplies the electric energy which changed and accumulated the mechanical energy generated when braking an internal combustion engine in electric energy, and was accumulated when accelerating an internal combustion engine to an auxiliary accelerator, and is made to generate mechanical energy.

[0002] This invention relates to electric braking of the automobile indicated by the international announcement official report WO 88/0617 (international application number PCT/JP/00157), and amelioration of an auxiliary accelerator. This invention is equipment suitable for carrying in the automobile equipped with the auxiliary acceleration and the auxiliary damping device which the applicant for this patent is manufacturing and selling under the name of HIMR.

[0003]

[Description of the Prior Art] The applicant for this patent indicated electric braking and the auxiliary accelerator of an automobile in the international announcement official report WO 88/0617 (international application number PCT/JP/00157). The squirrel-cage induction machine 2 with which that rotator section was directly linked with the internal combustion engine 1 as this equipment was shown in drawing 3 , It changes into the alternating voltage of the frequency to which many cels suited [ rotating magnetic field / of a rotational speed lower than an axial rotational speed of the squirrel-cage induction machine 2 ] carrying out induction in the direct current voltage of the battery 3 connected to the serial, and this battery 3. It has the inverter circuit 4 which gives this to the squirrel-cage induction machine 2, and changes the alternating current power from the squirrel-cage induction machine 2 into direct current power, and the inverter control circuit 5 which generates the control signal which sets up the frequency of the ac side electrical potential difference of this inverter circuit 4. A means to generate a control command by the operator according to operation of an automobile is included in this inverter control circuit 5.

[0004] Moreover, the revolution sensor 6 is attached in the internal combustion engine, the signal from this revolution sensor 6 is given to the inverter control circuit 5, and the information about the charge condition of a battery 3 inputs it further.

[0005] A capacitor 7 and the solid state switch circuit 12 are connected to the output side of an inverter circuit 4, and a resistor 11 is connected through this solid state switch circuit 12. When electrical energy superfluous like large braking in an automobile cannot carry out line crack regeneration occurs, this resistor 11 is constituted so that this may be made to dissipate.

[0006] Furthermore, the detector 13 which detects the output voltage of an inverter circuit 4 is connected to a battery 3 and the solid state switch circuit 12, and a resistor 11 is equipped with the current detector 15 which detects change of a current. The switch control circuit 14 which controls the solid state switch circuit 12 according to that detecting signal is connected to this current detector 15. A detector 13 is connected to this switch control circuit 14.

[0007] This equipment is carried in an automobile, at the time of braking of an automobile, the energy generated by braking is collected as electrical energy, and it stores electricity it at it, changes into mechanical energy that electrical energy that it stored electricity at the time of acceleration of an automobile, and gives the internal combustion engine for axle actuation auxiliary power.

[0008] That is, in the acceleration mode which uses the squirrel-cage induction machine 2 as an internal combustion engine's 1 APU, the inverter control circuit 5 gives the rotating magnetic field of the rate exceeding an internal combustion engine's 1 rotational speed to the squirrel-cage induction machine 2, and includes a means to control the inverter circuit 4 to give the rotating magnetic field of the rate which is less than an internal combustion engine's 1 rotational speed to the squirrel-cage induction machine 2, in the slowdown mode which uses the squirrel-cage induction machine 2 as an internal combustion engine's 1 damping device. Moreover, in acceleration mode, an inverter circuit 4 gives the dc output of the electrical energy accumulated in the battery 3 to the squirrel-cage

induction machine 2 as a polyphase current output, and includes the circuit means given to a battery 3 by making polyphase current output energy of the squirrel-cage induction machine 2 into a dc output in slowdown mode. [0009] The battery 3 of equipment is constituted such conventionally by the structure where many cels corresponding to the rated voltage by the side of a direct current of an inverter circuit 4 were connected to the serial.

[0010]

[Problem(s) to be Solved by the Invention] By the way, since the terminal voltage of this battery is a value practically exceeding 300V, From there being a possibility that an overcurrent may flow in the failure part and failure may be expanded if poor insulation and fault current occur by a certain unexpected failure In order to prevent this, when the current which exceeds a predetermined value in a battery is detected, the overcurrent breaker 20 which intercepts the high-tension circuit of a battery automatically as shown in drawing 4 will be formed in the terminal of the battery of this equipment at a serial. However, with this equipment, when this overcurrent breaker 20 operates temporarily and connection of a battery 3 is intercepted, all the power sources over this automobile will stop. When a power source stops, the equipments concerning operation stop [ no ] and it becomes impossible for an internal combustion engine's control circuit, the control circuit of a change gear or a clutch, a headlight, etc. to continue operation of an automobile.

[0011] Even if this invention is performed for such a background and the overcurrent breaker of the high-tension circuit of a battery operates, as a necessary minimum power source is supplied to an emergency power supply terminal, while securing the insurance of equipment, an automobile aims at offering the equipment which does not cause failure on the street.

[0012]

[Means for Solving the Problem] The squirrel-cage induction machine with which this invention was connected with an internal combustion engine's revolving shaft, and the battery by which the series connection of many cels was carried out, In braking of an internal combustion engine and an APU equipped with the inverter circuit which changes electrical energy bidirectionally and combines the polyphase current circuit of said squirrel-cage induction machine, and the direct current circuit of said battery, and the control circuit which controls this inverter circuit When the overcurrent breaker connected to the terminal of said battery at the serial and this overcurrent breaker change into an open condition, it is characterized by having the relay circuit which is interlocked with this overcurrent breaker and connects the terminal voltage of some cels of said battery to an emergency power supply terminal.

[0013] Said emergency power supply terminal is equal to the rated terminal voltage (a large-size car is 24V and a small-size car is 12V) of the automobile where the rated voltage is standard, and, as for said emergency power supply terminal, it is desirable to connect with the various loads of a car through antisuckback diode.

[0014]

[Function] If an overcurrent flows from the high-tension circuit of a battery by unexpected failure, an overcurrent breaker will operate and a high-tension circuit will be intercepted. This cutoff actuation is interlocked with, a relay circuit operates, and the terminal voltage of some cels of a battery is connected to an emergency power supply terminal.

[0015] Since operation of an internal combustion engine can be made by this to continue even if the power source from a high-tension circuit stops while being able to supply a necessary minimum power source to an emergency power supply terminal and being able to secure the insurance of equipment, an automobile can be promptly moved to the location which does not become the hindrance of traffic from on the street.

[0016]

[Example] Next, this invention example equipment is explained based on a drawing. The block diagram and drawing 2 which show the whole configuration concerning this invention example equipment in drawing 1 are drawing showing the configuration of the important section concerning this invention example equipment.

[0017] The squirrel-cage induction machine 2 with which this invention example equipment was connected with an internal combustion engine's 1 revolving shaft, The inverter circuit 4 with which many cels change electrical energy bidirectionally, and combine the battery 3 by which the series connection was carried out, and the polyphase current circuit of the squirrel-cage induction machine 2 and the direct current circuit of a battery 3, The inverter control circuit 5 which controls this inverter circuit 4, and the revolution sensor 6 which detects an internal combustion engine's 1 rotational speed, and sends out that detection output to the inverter control circuit 5, The capacitor 7 connected to the output side of an inverter circuit 4, and the solid state switch circuit 12, It has the resistor 11 connected to this solid state switch circuit 12, the detector 13 which detects the output voltage of an inverter circuit 4, the switch control circuit 14 which controls the solid state switch circuit 12, and the current detector 15 which detects current change of a resistor 11. Furthermore, when the overcurrent breaker 21 connected to the terminal of a battery 3 at the serial and this overcurrent breaker 21 change into an open condition as a description of this invention, The relay circuit 24 which is interlocked with this overcurrent breaker 21 and connects the terminal

voltage of some cels of a battery 3 to the emergency power supply terminal 23 in a panelboard 26, It has DC to DC converter 28 which changes the high tension (300V) of a battery 3 into a low battery (24V). The emergency power supply terminal 23 The rated voltage is equal to the rated terminal voltage (a large-size car is 24V and a small-size car is 12V) of a standard automobile, and is connected to the various loads of a car through the antisuckback diode 25.

[0018] Moreover, low voltage power supply connection switch 21b which will be interlocked with the overcurrent breaker 21 when overcurrent isolating-switch 21a which will be in an open condition automatically [ when an overcurrent flows ], and intercepts a power source at a high speed, and its overcurrent isolating-switch 21a change into an open condition, will be in a closed state, and supplies a low-battery (24V) power source to a relay circuit 24 is contained.

[0019] Next, actuation of this invention example equipment constituted in this way is explained.

[0020] If an overcurrent flows from the high-tension circuit of a battery 3 by unexpected failure, overcurrent isolating-switch 21a of the overcurrent breaker 21 will be in an open condition automatically, and the power source from a battery 3 will be intercepted. Simultaneously, actuation of this overcurrent isolating-switch 21a is interlocked with, and low voltage power supply connection switch 21b is set as a closed state.

[0021] If low voltage power supply connection switch 21b will be in a closed state, the terminal voltage from some cels equivalent to electrical-potential-difference 24 V parts of a battery 3 will be added to coil 24a of a relay circuit 24. This sets relay switches 24b and 24c as a closed state, and 24V minimum power source required for car operation is supplied to the emergency power supply terminal 23 of a panelboard 26.

[0022] From the emergency power supply terminal 23 of a panelboard 26, the supply path of 24V power source to the circuit needed for operation of cars, such as a control circuit of an internal combustion engine's control circuit, a change gear, and a clutch, a hazard lamp, a parking lamp, and a headlight, at worst has branched, current supply is promptly performed in these circuits, and it changes into the condition which can run a car.

[0023] The current supply way to various equipments other than the circuit needed at worst is connected through the antisuckback diode 25 for a panelboard 26 and car operation. For this reason, the supply of those other than the circuit from the panelboard 26 of 24V power source supplied to the emergency power supply terminal 23 is prevented. Since current supply is performed only from some cels of a battery 3 in a state of emergency, a battery 3 can stop this to the minimum, although charge capacity becomes an ununiformity.

[0024] Moreover, when the overcurrent breaker 21 operates, it indicates that the condition that 24V power source was supplied to the alarm lamp 27 arranged at the driver's seat, and it was in the present state of emergency by the burning, and the state of emergency could be avoided was set up, and it is notified to an operator.

[0025] In addition, the overcurrent breaker 21 is normal, when low voltage power supply connection switch 21b carries out short failure, an alarm lamp 27 lights up and an operator is told about failure of a relay circuit 24.

[0026]

[Effect of the Invention] There is effectiveness to which it can be made to move promptly in the location which does not become the hindrance of the traffic from on the street by the automobile while a necessary minimum power source can be supplied to an emergency power supply terminal when the high-tension circuit of a battery to an overcurrent flows by failure which is not expected according to [ as explained above ] this invention, an overcurrent breaker operates and a power source stops, and this secures the insurance of equipment.

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## DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] The block diagram showing the whole configuration concerning this invention example equipment.

[Drawing 2] Drawing showing the configuration of the important section concerning this invention example equipment.

[Drawing 3] The block diagram showing the whole configuration concerning conventional example equipment.

[Drawing 4] Drawing showing the configuration of the important section concerning conventional example equipment.

[Description of Notations]

1 Internal Combustion Engine

2 Squirrel-cage Induction Machine

3 Battery

4 Inverter Circuit

5 Inverter Control Circuit

6 Revolution Sensor

7 Capacitor

11 Resistor

12 Solid State Switch Circuit

13 Detector

14 Switch Control Circuit

15 Current Detector

20 21 Overcurrent breaker

21a Overcurrent isolating switch

21b Low voltage power supply connection switch

22 DC to DC Converter

23 Emergency Power Supply Terminal

24 Relay Circuit

24a Coil

24b, 24c Relay switch

25 Antisuckback Diode

26 Panelboard

27 Alarm Lamp

28 DC to DC Converter

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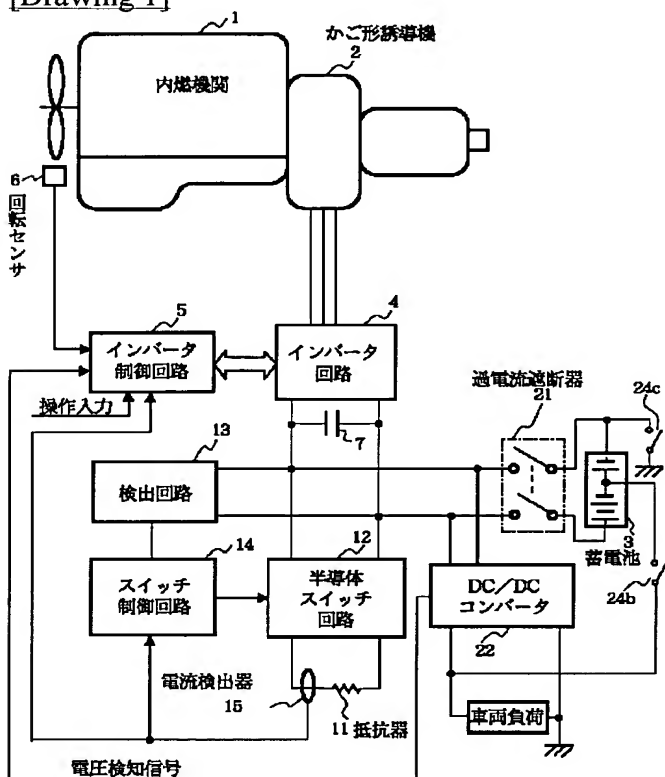
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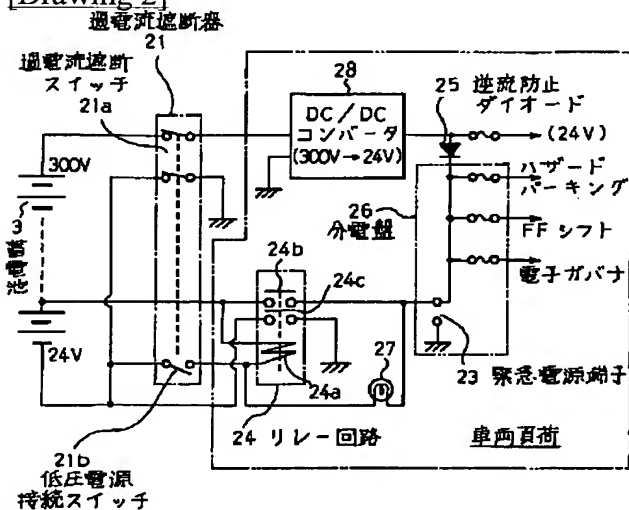
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## DRAWINGS

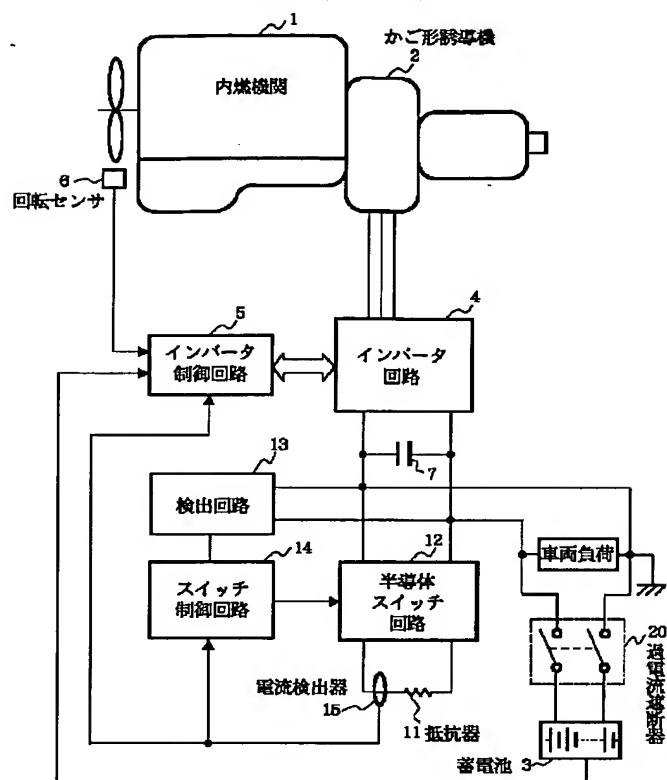
[Drawing 1]



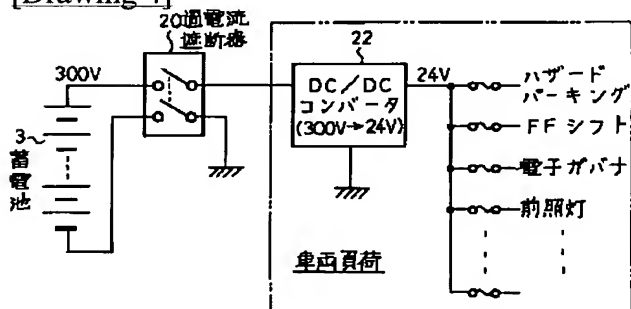
[Drawing 2]



[Drawing 3]



[Drawing 4]



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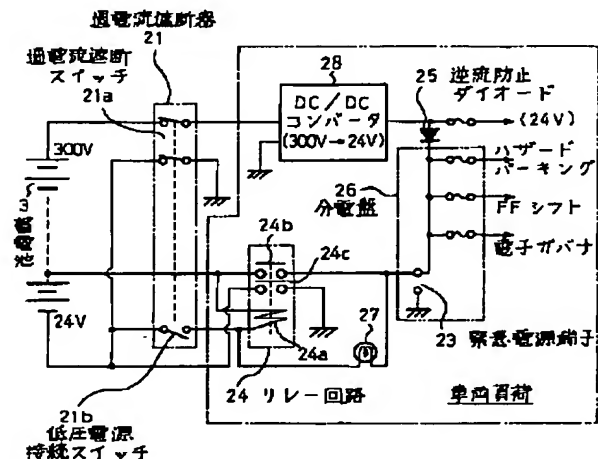
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(54)【発明の名称】 内燃機関の制動および補助動力装置

(57)【要約】

【目的】 予期せぬ故障により蓄電池の高圧回路から過電流が流れて過電流遮断器が動作し電源が停止したときに、必要最低限の電源が緊急電源端子に供給されるようにする。

【構成】 内燃機関の回転軸に連結されたかご形誘導機の高相交流回路と多数のセルが直列に接続された蓄電池の直流回路とを双方向に電気エネルギーを変換して供給する内燃機関の制動および補助動力装置において、蓄電池の端子に直列に過電流遮断器を接続し、この過電流遮断器が開放状態になったときに連動して蓄電池の一部のセルの端子電圧を緊急電源端子に接続するリレー回路を設ける。



## 【特許請求の範囲】

【請求項1】 内燃機関の回転軸に連結されたかご形誘導機と、多数のセルが直列接続された蓄電池と、前記かご形誘導機の多相交流回路と前記蓄電池の直流回路とを双方向に電気エネルギーを変換して結合するインバータ回路と、このインバータ回路を制御する制御回路とを備えた内燃機関の制動および補助動力装置において、前記蓄電池の端子に直列に接続された過電流遮断器と、この過電流遮断器が開放状態になったとき、この過電流遮断器と連動して前記蓄電池の一部のセルの端子電圧を緊急電源端子に接続するリレー回路とを備えたことを特徴とする内燃機関の制動および補助動力装置。

【請求項2】 前記緊急電源端子は、その定格電圧が標準的な自動車の定格端子電圧（大型車は24V、小型車は12V）に等しく、前記緊急電源端子は逆流防止ダイオードを介して車両の各種負荷に接続された請求項1記載の内燃機関の制動および補助動力装置。

## 【発明の詳細な説明】

## 【0001】

【産業上の利用分野】本発明は、内燃機関を制動するときに発生する機械的エネルギーを電氣的エネルギーに変換して蓄積し、内燃機関を加速するときに蓄積された電氣的エネルギーを補助加速装置に供給して機械的エネルギーを発生させる装置に利用する。

【0002】本発明は、国際公表公報WO88/0617（国際出願番号PCT/J P/00157）に開示された自動車の電気制動および補助加速装置の改良に関する。本発明は、HIMRの名称で本願出願人が製造販売している補助加速および補助制動装置を備えた自動車に搭載するに適する装置である。

## 【0003】

【従来の技術】本願出願人は、国際公表公報WO88/0617（国際出願番号PCT/J P/00157）に自動車の電気制動および補助加速装置を開示した。この装置は図3に示すように、内燃機関1にその回転子が直結されたかご形誘導機2と、多数のセルが直列に接続された蓄電池3と、この蓄電池3の直流電圧をかご形誘導機2の軸回転速度より低い回転速度の回転磁界を誘起するのに適した周波数の交流電圧に変換して、これをかご形誘導機2に与え、またかご形誘導機2からの交流電力を直流電力に変換するインバータ回路4と、このインバータ回路4の交流側電圧の周波数を設定する制御信号を生成するインバータ制御回路5とを備える。このインバータ制御回路5には自動車の運転に応じて運転者により制御指令を発生する手段を含む。

【0004】また、内燃機関には回転センサ6が取付けられていて、この回転センサ6からの信号はインバータ制御回路5に与えられ、さらに蓄電池3の充電状態に関する情報が入力する。

【0005】インバータ回路4の出力側にはコンデンサ

7および半導体スイッチ回路12が接続され、この半導体スイッチ回路12を介して抵抗器11が接続される。この抵抗器11は自動車に大きい制動が行われ再生することができないほどの過剰な電気エネルギーが発生したときに、これを消散させるように構成されている。

【0006】さらに、蓄電池3および半導体スイッチ回路12にはインバータ回路4の出力電圧を検出する検出回路13が接続され、抵抗器11には電流の変化を検出する電流検出器15が備えられる。この電流検出器15にはその検出信号にしたがって半導体スイッチ回路12を制御するスイッチ制御回路14が接続される。このスイッチ制御回路14には検出回路13が接続される。

【0007】この装置は自動車に搭載して、自動車の制動時には制動により発生するエネルギーを電気エネルギーとして回収して蓄電し、自動車の加速時にはその蓄電された電気エネルギーを機械エネルギーに変換して、車軸駆動用の内燃機関に補助動力を与えるものである。

【0008】すなわち、インバータ制御回路5は、かご形誘導機2を内燃機関1の補助動力装置とする加速モードでは、かご形誘導機2に内燃機関1の回転速度を越える速度の回転磁界を与え、かご形誘導機2を内燃機関1の制動装置とする減速モードでは、かご形誘導機2に内燃機関1の回転速度を下回る速度の回転磁界を与えるようにそのインバータ回路4を制御する手段を含む。またインバータ回路4は、加速モードでは蓄電池3に蓄積された電気エネルギーの直流出力をかご形誘導機2に多相交流出力として与え、減速モードではかご形誘導機2の多相交流出力エネルギーを直流出力として蓄電池3に与える回路手段を含む。

【0009】このような従来装置の蓄電池3は、インバータ回路4の直流側の定格電圧に対応するセルが多数直列に接続された構造に構成されている。

## 【0010】

【発明が解決しようとする課題】ところでこの蓄電池の端子電圧は実用上300Vを越える値であるため、何らかの予期せぬ故障により絶縁不良や漏電が発生すると、その故障箇所を過電流が流れて故障が拡大するおそれがあることから、これを防止するために蓄電池に所定値を越える電流が検出されたときには、図4に示すように自動的に蓄電池の高圧回路を遮断する過電流遮断器20がこの装置の蓄電池の端子に直列に設けられることになった。しかし、この装置では仮にこの過電流遮断器20が作動して蓄電池3の接続が遮断されると、この自動車に対するあらゆる電源が停止してしまうことになる。電源が停止すると、内燃機関の制御回路、変速装置やクラッチの制御回路、前照灯など、運行に係るすべての装置が停止してしまい自動車の運転を継続することができなくなる。

【0011】本発明はこのような背景で行われたものであって、蓄電池の高圧回路の過電流遮断器が作動して

も、必要最低限の電源が緊急電源端子に供給されるようにして、装置の安全を確保するとともに自動車が路上故障を起こすことのない装置を提供することを目的とする。

#### 【0012】

【課題を解決するための手段】本発明は、内燃機関の回転軸に連結されたかご形誘導機と、多数のセルが直列接続された蓄電池と、前記かご形誘導機の多相交流回路と前記蓄電池の直流回路とを双方向に電気エネルギーを変換して結合するインバータ回路と、このインバータ回路を制御する制御回路とを備えた内燃機関の制動および補助動力装置において、前記蓄電池の端子に直列に接続された過電流遮断器と、この過電流遮断器が開放状態になったとき、この過電流遮断器と連動して前記蓄電池の一部のセルの端子電圧を緊急電源端子に接続するリレー回路とを備えたことを特徴とする。

【0013】前記緊急電源端子は、その定格電圧が標準的な自動車の定格端子電圧（大型車は24V、小型車は12V）に等しく、前記緊急電源端子は逆流防止ダイオードを介して車両の各種負荷に接続されることが望ましい。

#### 【0014】

【作用】予期せぬ故障により蓄電池の高圧回路から過電流が流れると、過電流遮断器が動作し高圧回路を遮断する。この遮断動作に連動してリレー回路が動作し蓄電池の一部のセルの端子電圧を緊急電源端子に接続する。

【0015】これにより、高圧回路からの電源が停止しても、必要最低限の電源を緊急電源端子に供給することができ、装置の安全を確保することができることから、自動車を路上から交通の妨げにならない場所に速やかに移動させることができる。

#### 【0016】

【実施例】次に、本発明実施例装置を図面に基づいて説明する。図1は本発明実施例装置に係わる全体構成を示すブロック図、図2は本発明実施例装置に係わる要部の構成を示す図である。

【0017】本発明実施例装置は、内燃機関1の回転軸に連結されたかご形誘導機2と、多数のセルが直列接続された蓄電池3と、かご形誘導機2の多相交流回路と蓄電池3の直流回路とを双方向に電気エネルギーを変換して結合するインバータ回路4と、このインバータ回路4を制御するインバータ制御回路5と、内燃機関1の回転速度を検出しその検出出力をインバータ制御回路5に送出する回転センサ6と、インバータ回路4の出力側に接続されたコンデンサ7および半導体スイッチ回路12と、この半導体スイッチ回路12に接続された抵抗器11と、インバータ回路4の出力電圧を検出する検出回路13と、半導体スイッチ回路12を制御するスイッチ制御回路14と、抵抗器11の電流変化を検出する電流検出

器15とを備える。さらに、本発明の特徴として、蓄電池3の端子に直列に接続された過電流遮断器21と、この過電流遮断器21が開放状態になったとき、この過電流遮断器21と連動して蓄電池3の一部のセルの端子電圧を分電盤26内の緊急電源端子23に接続するリレー回路24と、蓄電池3の高電圧（300V）を低電圧（24V）に変換するDC/DCコンバータ28とを備え、緊急電源端子23は、その定格電圧が標準的な自動車の定格端子電圧（大型車は24V、小型車は12V）に等しく、逆流防止ダイオード25を介して車両の各種負荷に接続される。

【0018】また、過電流遮断器21には、過電流が流れたときに自動的に開状態となり電源を高速に遮断する過電流遮断スイッチ21aと、その過電流遮断スイッチ21aが開状態となったときに連動して閉状態となり低電圧（24V）電源をリレー回路24に供給する低圧電源接続スイッチ21bが含まれる。

【0019】次に、このように構成された本発明実施例装置の動作について説明する。

【0020】予期せぬ故障により蓄電池3の高圧回路から過電流が流れると、過電流遮断器21の過電流遮断スイッチ21aが自動的に開状態となり蓄電池3からの電源が遮断される。同時に、この過電流遮断スイッチ21aの動作に連動して低圧電源接続スイッチ21bが閉状態に設定される。

【0021】低圧電源接続スイッチ21bが閉状態になると、蓄電池3の電圧24V分に相当する一部分のセルからの端子電圧がリレー回路24のコイル24aに付加される。これによりリレースイッチ24bおよび24cを閉状態に設定し、車両運行のために必要な最低限の24V電源を分電盤26の緊急電源端子23に供給する。

【0022】分電盤26の緊急電源端子23からは内燃機関の制御回路、変速装置およびクラッチの制御回路、ハザードランプ、パーキングランプ、前照灯などの車両の運行に最低限必要とされる回路への24V電源の供給経路が分岐されていて、直ちにこれらの回路に電源供給が行われ車両を走行可能な状態にする。

【0023】分電盤26と車両運行のために最低限必要とされる回路以外の各種装置への電源供給路とは逆流防止ダイオード25を介して接続されている。このために、緊急電源端子23に供給された24V電源の分電盤26からの回路以外への供給は阻止される。緊急状態では蓄電池3の一部のセルからのみ電源供給が行われるから、蓄電池3は充電容量が不均一になるが、これを最小限に抑えることができる。

【0024】また、過電流遮断器21が動作したときには、運転席に配置された警報ランプ27に24V電源が供給され、その点灯により現在緊急状態にあり、かつその緊急状態を回避できる状態が設定されたことを表示し運転者に通報する。

【0025】なお、過電流遮断器21が正常であり、低圧電源接続スイッチ21bがショート故障した場合に警報ランプ27が点灯しリレー回路24の故障を運転者に知らせる。

【0026】

【発明の効果】以上説明したように本発明によれば、予期せぬ故障により蓄電池の高圧回路から過電流が流れて過電流遮断器が動作し電源が停止したときに、必要最低限の電源を緊急電源端子に供給することができ、これにより装置の安全を確保するとともに、自動車を路上から交通の妨げにならない場所に速やかに移動させることができる効果がある。

【図面の簡単な説明】

【図1】本発明実施例装置に係わる全体構成を示すブロック図。

【図2】本発明実施例装置に係わる要部の構成を示す図。

【図3】従来例装置に係わる全体構成を示すブロック図。

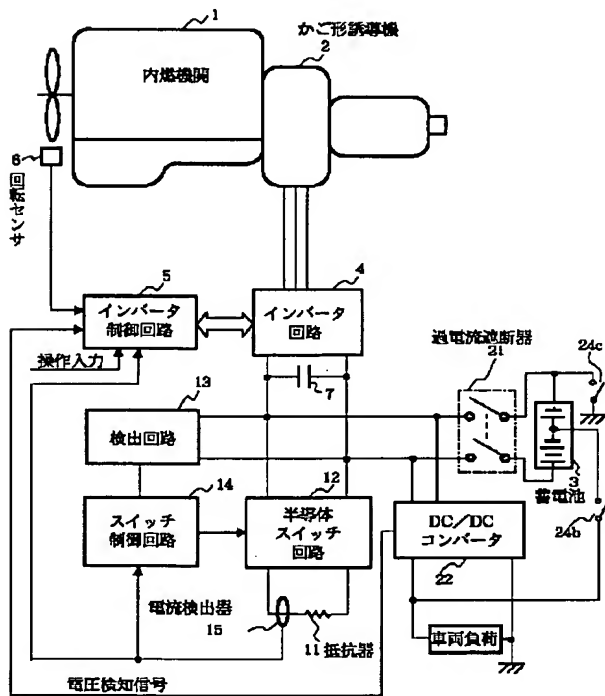
【図4】従来例装置に係わる要部の構成を示す図。

【符号の説明】

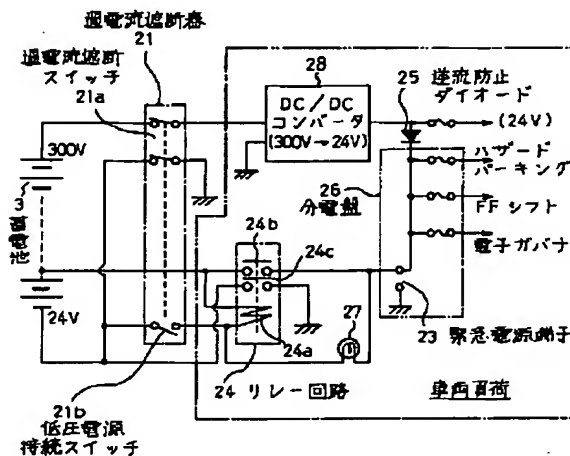
- 1 内燃機関
- 2 かご形誘導機

- 3 蓄電池
- 4 インバータ回路
- 5 インバータ制御回路
- 6 回転センサ
- 7 コンデンサ
- 11 抵抗器
- 12 半導体スイッチ回路
- 13 検出回路
- 14 スイッチ制御回路
- 15 電流検出器
- 10 20、21 過電流遮断器
- 21 a 過電流遮断スイッチ
- 21 b 低圧電源接続スイッチ
- 22 DC/DCコンバータ
- 23 緊急電源端子
- 24 リレー回路
- 24 a コイル
- 24 b、24 c リレースイッチ
- 25 逆流防止ダイオード
- 26 分電盤
- 27 警報ランプ
- 28 DC/DCコンバータ

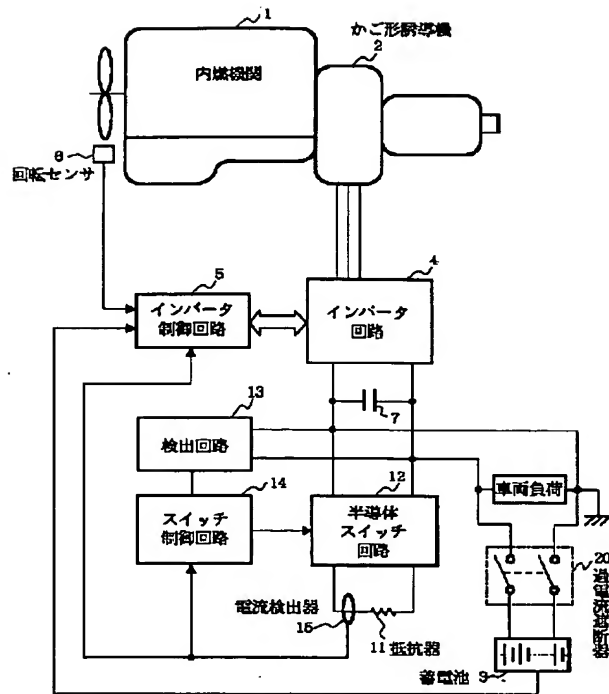
【図1】



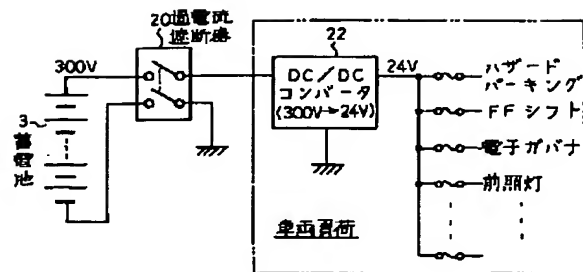
【図2】



【図3】



【図4】



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